

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1287

Roll No.

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**B. Tech.****(Semester II) Even Semester Theory Examination, 2012-13****ENGINEERING MECHANICS****Time : 3 Hours]****[Total Marks : 100****Note :** Attempt questions from all Sections as per instructions.**Section-A**Attempt *all* parts of this question. Each part carries 2 marks.

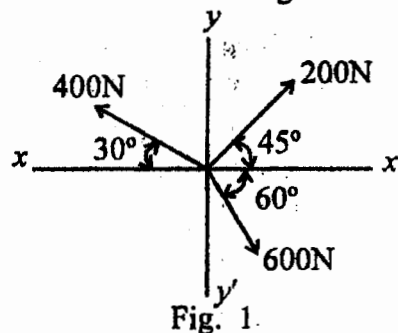
2×10=20

1. (a) State the principle of transmissibility of forces.
- (b) Write the general conditions for equilibrium of a particle.
- (c) State Varignon's theorem.
- (d) List any four engineering applications of friction.
- (e) Define centre of gravity and centroid.
- (f) State parallel axis theorem.
- (g) A body is moving with a velocity of 4 m/s. After 5 seconds the velocity of the body becomes 10 m/s. Find the acceleration of the body.
- (h) Write the general equations for curvilinear motion.
- (i) State D'Alemberts principle.
- (j) State the principle of virtual work.

**Section-B**Attempt any *three* parts of this question. Each part carries 10 marks.

10×3=30

2. (a) (i) Two concurrent forces of 12 N and 18 N are acting at an angle of 60°. Find the resultant force.
- (ii) Three coplanar concurrent forces are acting at a point as shown in Fig. 1. Determine the resultant in magnitude and direction.



- (b) A beam  $AB$  of span 10 m loaded as shown in Fig. 2. Determine the reactions at  $A$  and  $B$ .

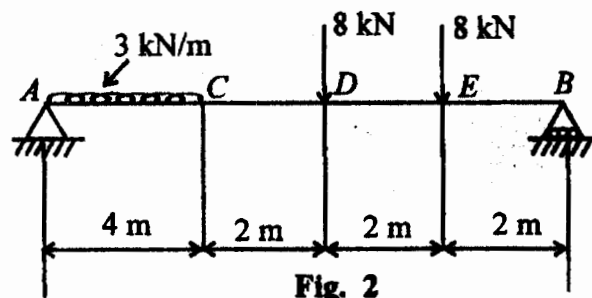


Fig. 2

- (c) Locate the centroid of the lamina shown in Fig. 3.

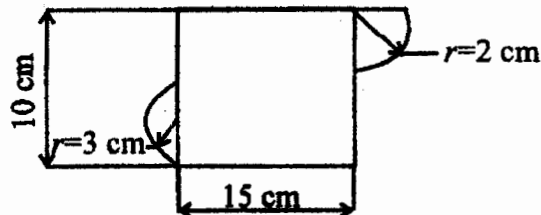


Fig. 3

- (d) A car starts from rest and uniformly accelerated to speed of 20 km per hour over a distance of 200 m. Calculate the acceleration and time taken. If further acceleration raises the speed to 50 km per hour in 8 seconds, find the acceleration and the further distance moved.
- (e) Fig. 4 shows a body of weight 300 N on a smooth horizontal plane is attached by a string to a 30 N weight, which hangs vertically. Find the acceleration of the system and the tension in the string.

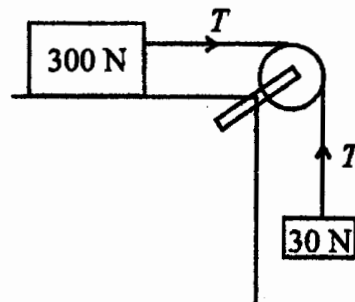


Fig. 4

### Section-C

Attempt *all* questions of this Section. Each question carries 10 marks.  $10 \times 5 = 50$

3. Attempt any *one* part :

- (a) An electric light fixture weighing 150 N hangs from a point  $C$ , by two strings  $AC$  and  $BC$  as shown in Fig. 5. Determine the forces in the strings  $AC$  and  $BC$ .

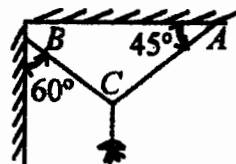


Fig. 5